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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/679,556	**Applicant(s)** RAMSEY, WILLIAM D.
	Examiner MICHAEL C. COLUCCI	**Art Unit** 2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-26 and 29-31* is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1,2,5-26 and 29-31* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *06 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☒ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 07/09/2008 have been fully considered but they are not persuasive.

Argument 1 (page 8 paragraph 3 - page 9 paragraph 4):

- "none of the cited references show or suggest a transition probability that is generated by dividing a count of the number of times a pair of semantic entities appear in a particular order on a same level of training data by a count of the number of times the pair of entities appear on the same level in the training data."

Response to argument 1 :

Examiner takes the position that the primary reference Su et al. US 5418717 A (hereinafter Su) is in fact within the scope of claim 1, wherein Su teaches a mechanism for deriving the syntactic score is illustrated. FIG. 4 represents a syntax tree 400 having a plurality 450 of reduction sequences L.sub.1 to L.sub.8 (produced by bottom-up parsing). Specifically, the syntax tree 400, which comprises a sentence of four words (w.sub.1 -w.sub.4), can be decomposed into a plurality of phrase levels which correspond to the reduction sequences 450. A phrase level is a set of terminal and nonterminal nodes that appear at a step of the parsing process where the reduction sequence L.sub.i is the i-th phrase level and the transition from a phrase level L.sub.i to the next phrase level L.sub.i+1 corresponds to a reduction of some terminals or nonterminals at time t.sub.i (Col. 13 lines 18-32)

Further, Su teaches that a syntactic score may be formulated as the product of the conditional probability of a phrase level being reduced (into the next level), given the previous sequence of phrase levels (e.g., level 3 reducing into level 4). These individual probabilities may be simplified into conditional probabilities of a phrase level based on the immediately preceding phrase level (e.g., level 3). Thus, the syntactic score may be rewritten into the conditional probability of a given symbol being reduced into the next level, based on the given reducing symbols and their left and right contexts (Col. 13 lines 34-44).

Furthermore, Su even specifically teaches various (conditional) probabilities (hereinafter, the parameters for the scoring mechanism) in the previous sections can be estimated from a master text (i.e., a text corpus). The general approach to estimate such probabilities is to divide a frequency of occurrence of an event at a given condition by the frequency of occurrence of any event at the same given condition. For example, the frequency of occurrence of one phrase level being reduced from a known phrase level is divided by the frequency of occurrence of any phrase level being reduced from the same known phrase level to estimate the transition probability required for syntactic score. Such an estimation method is known as the Maximum Likelihood Estimation (Col. 15 lines 53-66).

Additionally, Su teaches grammar rules, indicative of the parent-children node relationship among grammatical constituents, by computer processing means, and assigning an ordered list of numbers (hereinafter, a permutation vector), for each grammar rule indicative of the semantic precedence of each child node relative to the other nodes (Col. 21 lines 4-10).

Additionally, Su teaches a syntactic score, semantic score, and transition probability relevant to the transitioning from one phrase level to the next, wherein syntactic and semantic scores are combined, but a syntactic score is directly dependent on a transition probability (Fig. 10A). Su also teaches a Semantic Score module 324 that improves the process of selection by deriving an appropriate semantic annotation when the lexical categories and the syntactic analyses of the input text are known. A semantic annotation is the tagging of a word with particular semantic features. The Semantic Score module 324 is accessed by semantic feature(s) assigned to both the words under consideration and the syntactic categories of the constructed syntactic structures. Examples of semantic features are verbs of location, such as "locate"; verbs of production such as "write" and "build"; nouns of position such as "park" "New York", and the like. Since disambiguation has, to a large extent, already been performed by the

Lexical and Syntactic modules, only a few semantic features need be employed. The accessing method for the Semantic Score module 324 is similar to the previously described method for accessing the Syntactic Score module 323 which also considers the context terms (Col. 9 line 66 – Col. 10 line 18). *Examiner construes "levels" to be functionally equivalent and effective to terms that both describe a specific feature such as location. This concept is consistent with that of the present invention's Fig. 7, wherein city and city name are considered a "level" any other word that is on that same "level" is considered a potential pair, such as New York and a park are both places.*

However, Deligne et al. US 6314399 B1 (hereinafter Deligne) was incorporated to strongly address the method of a transition score. Though Su teaches a transition probability and dividing a frequency of occurrence of an event at a given condition by the frequency of occurrence of any event at the same given condition similar to that of Bayes theorem, Su does not specifically teach the operation of dividing a count of the number of times a pair of semantic entities appear in a particular order on a same level of training data by a count of the number of times the pair of entities appear on the same level in the training data. The frequency of occurrence calculation that Su teaches is very similar to the operation of dividing a count of the number of times a pair of semantic entities appear in a particular order on a same level of training data by a count of the number of times the pair of entities appear on the same level in the training data, the specific use of training data is not mentioned. Deligne in fact teaches taking as an input a training string of units, registering in an inventory of sequences all the combinations of 1 to N units occurring in the input string, counting the number of times all sequences of units occur and the number of times all pairs of sequences of units co-occur in the input training strings of units, computing an initial bigram probability distribution of all the pairs of sequences as the counted number of times the two sequences co-occur divided by the counted number of times the first sequence occurs in the input training string, and outputting the inventory of sequence and the initial bigram probability distribution of the sequences in the inventory (Deligne Col. 3 lines 26-38).

Since Su teaches the use of phrase/sentential level analysis, semantic scores, syntactic scores, transition probabilities, frequency of occurrence of semantic data, etc. Su in combination with Deligne would have been obvious, particularly relevant to training data, wherein general approach to estimate such probabilities is to divide a frequency of occurrence of an event at a given condition by the frequency of occurrence of any event at the same given condition. For example, the frequency of occurrence of one phrase level being reduced from a known phrase level is divided by the frequency of occurrence of any phrase level being reduced from the same known phrase level to estimate the transition probability required for syntactic score. Such an estimation method is known as the Maximum Likelihood Estimation (Col. 15 lines 53-66). Su teaches the use of transition probabilities relevant to syntactic and semantic data, wherein the use of bigram probability by Deligne is considered as an additional type of probability but the similar operation of frequency of occurrence by both Su and Deligne still remains, with Deligne being more specific to training data.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen to incorporate generating a transition probability comprises dividing a count of the number of times the pair of semantic entities appear in a particular order on the same level in training data by a count of the number of times the pair of semantic entities appear on the same level in the training data as taught by Deligne to allow for a probability that takes into account semantic, syntactic, and transition probabilities relevant to training data to generate a set of all possible combination of words or word sequences, wherein the frequency of occurrence as well as further probabilities relevant to letters, words, sentences, or other larger discourse structures are taken into consideration by counting the number of times all sequences of units occur and the number of times all pairs of sequences of units co-occur in the input training strings of units, computing an initial bigram probability distribution of all the pairs of sequences as the counted number of times the two sequences co-occur divided by the counted number of times the first sequence occurs in the input training string (Deligne Col. 3 lines 26-38).

Argument 2 (page 8 paragraph 3 - page 9 paragraph 4):

- “Since Hansen does not show or suggest constructing a table that contains a set of semantic structures found in a schema and that is indexed by two semantic entities, and since Hansen does not show or suggest forming a semantic structure for each semantic structure in a set of semantic structures that is located using two semantic entities, the combination of cited art does not show or suggest the invention of claim 11”

Response to argument 2 :

Though Su teaches the construction of a lexical ambiguity table, Su does not in fact teach semantically searching and indexing a table relevant to a structured environment. Hansen et al. S 20030014399 A1 (hereinafter Hansen) has been incorporated to further strengthen the combination of Su, Cohen, and Deligne relevant to searching a semantic table.

Su teaches that a lexical ambiguity table is constructed. In particular, the lexical databases 321, 322 are accessed by the words of a sentence to be translated. Referring now to FIG. 7, the construction of a lexical ambiguity table 700 is illustrated for the sentence "The beautiful rose was a present." As shown, each word of the sentence 701 is analyzed according to its possible part of speech. For example, the words "the" and "a" can only be articles. The word "rose", on the other hand, can be either a noun or a verb. Thus, the table 700 is constructed by indicating the possible parts of speech each word of the sentence may have. In addition to this parts-of-speech assignment, corresponding probabilities for each are obtained from the lexical modules and inserted into the table. From the simple sentence 701 shown in table 700, it can be seen that ambiguity exists with respect to the words "rose" and "present". Particularly, "rose" may represent a noun (flower) or a verb (past tense of "rise"). Similarly, the word "present" may represent a noun, an adjective, or a verb (Col. 17 lines 47-66).

Furthermore, Su teaches a schema relevant to Fig. 4 of the present invention (types of semantic entities), wherein Su teaches a syntactic score, semantic score, and transition probability relevant to the transitioning from one phrase level to the next, wherein syntactic and semantic scores are combined, but a syntactic score is directly dependent on a transition probability (Fig. 10A). Su also teaches a Semantic Score module 324 that improves the process of selection by deriving an appropriate semantic annotation when the lexical categories and the syntactic analyses of the input text are known. A semantic annotation is the tagging of a word with particular semantic features. The Semantic Score module 324 is accessed by semantic feature(s) assigned to both the words under consideration and the syntactic categories of the constructed syntactic structures. Examples of semantic features are verbs of location, such as "locate"; verbs of production such as "write" and "build"; nouns of position such as "park" "New York", and the like. Since disambiguation has, to a large extent, already been performed by the Lexical and Syntactic modules, only a few semantic features need be employed. The accessing method for the Semantic Score module 324 is similar to the previously described method for accessing the Syntactic Score module 323 which also considers the context terms (Col. 9 line 66 – Col. 10 line 18). *Examiner construes "levels" to be functionally equivalent and effective to terms that both describe a specific feature such as location. This concept is consistent with that of the present invention’s Fig. 7, wherein city and city name are considered a “level" any other word that is on that same "level" is considered a potential pair, such as New York and a park are both places.*

Hansen teaches a method of improving search of a database has been developed. The method comprises, monitoring user search activity in a user population, extracting search sessions, defined by search queries and paths, from user search activity, determining groups of semantically related queries or paths based on search session data, determining probabilities that records in the database are relevant for each query or path group, maintaining a table associating an index for each record in the database with the probability that the record is relevant for each query or path group, and, supplementing search results with information regarding records from the database with tabulated relevance probabilities (Hansen [0026]).

Further, Hansen teaches a structure called a search session, wherein technically, a search session consists of a user's search terms and the indices of the records they accessed in the database while searching. 3) We maintain a table of the number of times each record was accessed in response to each search term issued by a community of users. Every time a user conducts a search, we increment the appropriate elements in this table based on the associated search session. A search session may also include a timestamp. 4) Recognizing that semantically related search terms lead users to access many of the same records, we use this table to form groups or clusters of search terms, known as query groups based on the patterns of accesses recorded by the search sessions. With some kinds of clustering, a search term may belong to several groups and a numerical score is used to describe the strength of association (Hansen [0040]).

Examiner construes the use of a semantic structure to be functionally equivalent and equally effective to that of a semantic *data* structure, wherein a data structure is merely a method of storing data, in this case the data is semantic data, such as that taught within the present invention (page 26 specification). Both Su and Hansen teach semantic terms within a table relevant to discourse or sentences.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen and Deligne to incorporate searching the table using the two semantic entities to locate the set of semantic structures and forming a semantic structure for each semantic structure in the set of semantic structures as taught by Hansen to allow for indexed probabilities associated/tagged with each semantic relation found during the searching of a table, wherein more than one word or groups of words are analyzed (Hansen [0026]).

Argument 3 (page 11 paragraph 3):

- “Claim 19 is not shown or suggested in the combination of Su and Sumita. In particular, neither reference shows or suggests placing a full semantic structure in multiple command semantic structures after determining there are no more semantic nodes to process and after determining that the full semantic structure is not a command semantic structure. In the Office Action, it was asserted that Sumita shows the step of placing a full semantic structure in multiple command semantic structures in column 14, lines 1-17. Applicant respectfully disputes this assertion”

Response to argument 3 :

Examiner takes the position that Su in view of Sumita in fact teaches placing a full semantic structure in multiple command semantic structures, wherein Sumita teaches a document detection system, comprising: input analysis means for determining a semantic structure of a detection command containing natural language expressions entered by a user; document storage means for storing a plurality of detection target documents; and detection processing means for detecting those detection target documents stored in the document storage means which contain the semantic structure of the detection command determined by the input analysis means as detected documents (Sumita Col. 3 lines 45-55

Further, in light of the specification of the present invention, regarding the **broad** use of a *placing a full semantic structure in multiple command semantic structures,* Sumita in fact teaches a document detection system, comprising: input means for entering a detection command specified by a user; document storage means for storing a plurality of detection target documents; detection processing means for detecting those detection target documents stored in the document storage means which match with the detection command entered at the input means as detected documents; summary generation means for automatically generating a summary of each detected document obtained by the detection processing means according to text structures of each detected document; and detection result output means for displaying each summary generated by the summary generation means (Sumita Col. 4 lines 4-16). It is clear that Sumita in fact teaches the use of semantic structures, wherein a plurality of semantic structures as well a plurality of documents stored in an index memory (Sumita Fig. 11). Sumita further teaches presence of the documents having different relationships between two keywords "computer" and "design", according to the command from the user entered through the input unit 11, the detection processing unit 13 controls the detection result output unit 17 to display a list for these two semantic structures, whenever one keyword in the detection key coincides with either the target word or the source word for these two semantic structures in the semantic structure index memory. Sumita also teaches keyword detection operation using the detection key is carried out, according to the command from the user entered through the input unit 11, the detection processing unit 13 looks up the semantic structure index memory for the file name of each document obtained by the keyword detection operation, and controls the detection result output unit 17 to display the document name of each document along with all the semantic structures contained in each document in a format of the target word, the relation symbol, and the source word. At this point, a list display of all the documents containing each semantic structure can be provided for each semantic structure separately along with a display of the semantic structures, such that the user can Immediately recognize the semantic structures contained in the documents obtained by the keyword detection operation (Sumita Col. 22 lines 30-63).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 7-10, 12-14, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al. US 5418717 A (hereinafter Su) in view of Cohen et al. US 20040220892 A1 (hereinafter Cohen) and further in view of Deligne et al. US 6314399 B1 (hereinafter Deligne).

Re claim 1, Su teaches a method of identifying a semantic structure from a text the method comprising:

identifying semantic entities from the text (Col. 9 line 66 - Col. 10 line 6);

combining semantic entities to form at least two candidate semantic structures (Col. 15 lines 32-40), each candidate semantic structure having at least one parent semantic entity and at least one child semantic entity;

generating a semantic score for each candidate semantic structure (Col. 11 lines 42-50) based on the probability of a child semantic entity given a parent semantic entity in the respective candidate semantic structure;

generating a transition score for each candidate semantic structure (Col. 15 lines 40-49) by generating a separate transition probability for each pair of semantic entities that appear on a same level in a candidate semantic structure wherein generating a transition probability (Col. 15 lines 53-66) comprises dividing a count of the number of times the pair of semantic entities appear in a particular order on the same level in training data by a count of the number of times the pair of semantic entities appear on the same level in the training data

generating a syntactic score for each candidate semantic structure based in part on the position of a word in the text and the position in the semantic structure of a semantic entity formed from the word (Col. 10 lines 19-34);

combining the syntactic score, the transition score, and the semantic score for each semantic structure (Col. 10 lines 19-34) to select one of the candidate semantic structures for at least a portion of the text (Col. 17 lines 4-21).

However, Su fails to teach each candidate semantic structure having at least one parent semantic entity and at least one child semantic entity (Cohen [0005])

based on the probability of a child semantic entity given a parent semantic entity in the respective candidate semantic structure (Cohen [0005]).

Cohen teaches a typical Bayesian network classifier may be represented as a graph structure having a set of nodes and interconnecting arcs that define parent-child relationships among the nodes. A Bayesian network classifier usually includes a set of Bayesian network parameters which are associated with the nodes of the graph structure. The Bayesian network parameters usually specify the probabilities that each child node in the graph structure is in a particular state given that its parent nodes in the graph structure are in a particular state. Typically, the nodes of a Bayesian network classifier are associated with variables of an underlying application and the Bayesian network parameters indicate the strength of dependencies among the variables.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su to incorporate each candidate semantic structure having at least one parent semantic entity and at least one child semantic entity based on the probability of a child semantic entity given a parent semantic entity in the respective candidate semantic structure as taught by Cohen to allow for parent-child relationships in a nodal structure, wherein a probabilistic state transition is possible and the strength of each classified term is applied (Cohen [0005]).

However, Su in view of Cohen fails to teach dividing a count of the number of times the pair of semantic entities appear in a particular order on the same level in training data by a count of the number of times the semantic entities appear on the same level in the training data (Deligne Col. 3 lines 26-38).

Deligne teaches taking as an input a training string of units, registering in an inventory of sequences all the combinations of 1 to N units occurring in the input string, counting the number of times all sequences of units occur and the number of times all pairs of sequences of units co-occur in the input training strings of units, computing an initial bigram probability distribution of all the pairs of sequences as the counted number of times the two sequences co-occur divided by the counted number of times the first sequence occurs in the input training string, and outputting the inventory of sequence and the initial bigram probability distribution of the sequences in the inventory.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen to incorporate generating a transition probability comprises dividing a count of the number of times the pair of semantic entities appear in a particular order on the same level in training data by a count of the number of times the pair of semantic entities appear on the same level in the training data as taught by Deligne to allow for a probability that takes into account semantic, syntactic, and transition probabilities relevant to training data to generate a set of all possible combination of words or word sequences, wherein the frequency of occurrence as well as further probabilities relevant to letters, words, sentences, or other larger discourse structures are taken into consideration by counting the number of times all sequences of units occur and the number of times all pairs of sequences of units co-occur in the input training strings of units, computing an initial bigram probability distribution of all the pairs of sequences as the counted number of times the two sequences co-occur divided by the counted number of times the first sequence occurs in the input training string (Deligne Col. 3 lines 26-38).

Re claim 2, Su teaches a method of claim 1 wherein generating a syntactic score comprises for each parent-child relationship (Col. 21 line 4-10) between semantic entities in a candidate semantic structure, identifying a token (Col. 5 line 58-68) position of a word associated with a parent semantic entity and identifying a token position (Col. 10 lines 19-34) of a word associated with a child semantic entity(Col. 21 line 4-10) and determining probability based on the token positions (Col. 10 lines 19-34).

Re claim 7, Su teaches a method of claim 1 wherein identifying semantic entities comprises using a schema (Col. 18 line 50-61) in which text is associated with semantic entities (Col. 9 line 66 - Col. 10 line 6).

Re claim 8, Su teaches a method of claim 7 wherein a single word is associated with multiple semantic entities in the schema (Col. 3 line 1-10).

Re claims 9 and 10, Su teaches a method of claim 7 wherein using semantic entities to form a semantic structure comprises basing the semantic structure on relationships (Fig. 103, Col. 6 line 1-14) between semantic entities that are defined in a schema (Col. 3 line 1-10).

Re claim 12 and 13, Su teaches a method of claim 1 further comprising combining a selected semantic structure with a further semantic entity identified from the text to form an expanded semantic structure (Col. 9 line 32-43 and Col. 2 line 12-21)

Re claim 14, Su teaches a method of claim 12 wherein combining a selected semantic structure with a further semantic entity comprises performing an ordered search (Col. 19 lines 9--19) comprising

determining if the further semantic entity can be placed beneath (Col. 21 line 11-15) any of the entities in the selected semantic structure (fig. 4) determining if a head (Col. 21 line 1-10) of the selected semantic structure can be placed beneath (fig. 4) the further semantic entity

determining if there is a common ancestor entity that both the further semantic entity and the head of the selected semantic structure can be placed beneath (Col. 21 line 1-10)

Re claim 18, Su teaches a method of claim 1 further comprising pruning (Col. 19 line 9-19) a candidate semantic structure from further consideration based on the syntactic score (Col. 9 line 66 – Col. 10 line 18) and the semantic score (Col. 9 line 32-43 and Col. 2 line 12-21) for the semantic structure.

4. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al. US 5418717 A (hereinafter Su) in view of Cohen et al. US 20040220892 A1 (hereinafter Cohen) and Deligne et al. US 6314399 B1 (hereinafter Deligne) and further in view of Komori et al. US 6662159 B2 (hereinafter Komori).

Re claim 5, Su in view of Cohen and Deligne fails to teach a method of claim 1, wherein using semantic entities to form a candidate semantic structure comprises including semantic entities in the candidate semantic structure that are not identified from the text (Komori Col. 3 lines 54-64 & Fig. 5).

Komori teaches that a probability of state transition is suitably selected. As an example, the probability for the entire transitions is selected as 0.5. Also, there is suitably selected a penalty to be multiplied on the state output probability, for example as 0.92. FIG. 5 shows the configuration of a state transition model for the unknown word, determined in the above-explained manner. Further, Komori teaches a method of detecting the unknown word by describing the train of phonemes and syllables as grammar, forming an HMM network according to the grammar, incorporating such network in the grammar for recognition, and multiplying the output probability by a penalty at the recognition.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen and Deligne to incorporate using semantic entities to form a candidate semantic structure comprises including semantic entities in the candidate semantic structure that are not identified from the text as taught by Komori to account for unknown words through the use of state transition and/or a Hidden Markov Model (Komori Col. 3 lines 54-64 & Fig. 5).

Re claim 6, Su in view of Cohen and Deligne fails to teach a method of claim 5 wherein generating a semantic score comprises using a penalty factor to discount a probability of a semantic entity if the semantic entity was not identified from the text (Komori Col. 3 lines 54-64 & Fig. 5).

Komori teaches that a probability of state transition is suitably selected. As an example, the probability for the entire transitions is selected as 0.5. Also, there is suitably selected a penalty to be multiplied on the state output probability, for example as 0.92. FIG. 5 shows the configuration of a state transition model for the unknown word, determined in the above-explained manner. Further, Komori teaches a method of detecting the unknown word by describing the train of phonemes and syllables as grammar, forming an HMM network according to the grammar, incorporating such network in the grammar for recognition, and multiplying the output probability by a penalty at the recognition.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen and Deligne to incorporate including a penalty factor that discounts a probability of semantic entities that are not identified from the text as taught by Komori to account for unknown words through the use of state transition and/or a Hidden Markov Model (Komori Col. 3 lines 54-64 & Fig. 5).

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al. US 5418717 A (hereinafter Su) in view of Cohen et al. US 20040220892 A1 (hereinafter Cohen) and Deligne et al. US 6314399 B1 (hereinafter Deligne) and further in view of Hansen et al. US 20030014399 A1 (hereinafter Hansen).

Re claim 11, Su teaches a method of claim 9 wherein basing the semantic structure on relationships that are defined in a schema (Col. 11 lines 33-39) comprises:

searching the table using the two semantic entities to locate the set of semantic Structures (Col. 17 line 47-66)

However, Su in view of Cohen and Deligne fails to teach constructing a table with an entry that is indexed by two semantic entities and that contains a set of semantic structures found in the schema, each semantic structure containing the two semantic entities used to index the entry (Hansen [0026]).

forming a semantic structure for each semantic structure in the set of semantic structures (Hansen [0026]).

Hansen teaches extracting search sessions, defined by search queries and paths, from user search activity, determining groups of semantically related queries or paths based on search session data, determining probabilities that records in the database are relevant for each query or path group, maintaining a table associating an index for each record in the database with the probability that the record is relevant for each query or path group, and, supplementing search results with information regarding records from the database with tabulated relevance probabilities.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen and Deligne to incorporate searching the table using the two semantic entities to locate the set of semantic structures and forming a semantic structure for each semantic structure in the set of semantic structures as taught by Hansen to allow for indexed probabilities associated/tagged with each semantic relation found during the searching of a table, wherein more than one word or groups of words are analyzed (Hansen [0026]).

6. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al. US 5418717 A (hereinafter Su) in view of Cohen et al. US

20040220892 A1 (hereinafter Cohen) and Deligne et al. US 6314399 B1 (hereinafter Deligne) and further in view of Sumita et al. US 5907841 A (hereinafter Sumita).

Re claim 15, Su teaches a method of claim 1 further comprising:

semantic structure as the semantic structure of the text (Col. 9 line 66 – Col 10 line 6)

However, Su in view of Cohen and Deligne fails to teach determining that a selected semantic structure is not a command semantic structure (Sumita Col. 3 lines 45-55).

placing the selected semantic structure in a command semantic structure identifying the command (Sumita Col. 3 lines 45-55)

Sumita teaches a document detection system, comprising: input analysis means for determining a semantic structure of a detection command containing natural language expressions entered by a user; document storage means for storing a plurality of detection target documents; and detection processing means for detecting those detection target documents stored in the document storage means which contain the semantic structure of the detection command determined by the input analysis means as detected documents.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen and Deligne to incorporate determining a semantic command structure and placing the semantic structure in a command semantic structure as taught by Sumita to allow for the detection of target documents containing natural language data (Sumita Col. 3 lines 45-55).

Re claim 16, Su in view of Cohen and Deligne fails to teach a method of claim 5 further comprising placing the selected semantic structure in multiple semantic structures (Sumita Col. 14 lines 1-17).

Sumita teaches a document detection system, comprising: input analysis means for determining a semantic structure of a detection command containing natural language expressions entered by a user; document storage means for storing a plurality of detection target documents; and detection processing means for detecting those detection target documents stored in the document storage means which contain the semantic structure of the detection command determined by the input analysis means as detected documents.

Sumita teaches the semantic structure of the input character string is taken out from the individual data storage unit 16 at the step 1105, and the detection using the taken out semantic structure is carried out on a semantic structure index memory in the document storage unit 15 which stores all the semantic structures of all the documents in the document database, so as to obtain those documents which have the same semantic structure as that of the input character string.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen and Deligne to incorporate invention placing selected semantic structure in multiple command semantic structure as taught by Sumita to allow for proper classification of all semantic structures in all documents to ensure efficient indexing most relevant to the input text (Sumita Col. 14 lines 1-17).

Re claim 17, Su in view of Cohen and Deligne fails to teach a method of claim 16 further comprising scoring each command semantic structure and selecting a highest scoring command semantic structure as the semantic structure of the text (Sumita Col. 22 lines 1 -14)

Sumita teaches a document detection system, comprising: input analysis means for determining a semantic structure of a detection command containing natural language expressions entered by a user; document storage means for storing a plurality of detection target documents; and detection processing means for detecting those detection target documents stored in the document storage means which contain the semantic structure of the detection command determined by the input analysis means as detected documents.

Sumita teaches the semantic structure of the input character string is taken out from the individual data storage unit 16 at the step 1105, and the detection using the taken out semantic structure is carried out on a semantic structure index memory in the document storage unit 15 which stores all the semantic structures of all the documents in the document database, so as to obtain those documents which have the same semantic structure as that of the input character string.

Further, Sumita teaches detected documents are weighted according to the display priority scores determined in accordance with the document structure analysis result such as the title, table of content, index, and references of each document. For example, the display priority scores can be assigned as indicated in FIG. 39. In this case, the highest score for which each document qualify under the conditions concerning the keyword and the highest score for which each document qualify under the conditions concerning the semantic structure are added together as the score of each document, and the detected documents are displayed in a descending order of the assigned score.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su in view of Cohen and Deligne to incorporate selecting a highest scoring command semantic structure as the semantic structure of the text as taught by Sumita to allow for weighted priority scores to detect keywords and a summation of conditions relevant to semantic structures to be displayed (Sumita Col. 22 lines 1 -14).

7. Claims 19-26 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su et al. US 5418717 A (hereinafter Su) in view of Sumita et al. US 5907841 A (hereinafter Sumita).

Re claim 19, Su teaches a computer-readable medium having computer-executable instructions (Fig. 2) for performing steps comprising:

identifying semantic entities from a text (Col. 9 line 66 – Col 10 line 6) by creating semantic nodes and adding semantic entities identified from the text to the semantic nodes (Col. 9 lines 32-43 and Fig. 5)

forming a set of partial semantic structures (Col. 23 line 40-46) from the semantic entities at a semantic node (Col. 9 lines 32-43 and Fig. 5)

scoring (Col. 21 line 40-49) each of the partial semantic structures to provide a score for each partial semantic structure (Col. 23 line 40-46)

pruning (Col. 19 line 9-19) at least one partial semantic structure (Col. 23 line 40-46) and retaining (Col. 21 line 4-10) at least one partial semantic structure based on the scores for the partial semantic structures (Col. 21 line 40-49)

forming a full semantic structure (Col. 19 line 38-47 & Col 9 line 66 – Col 10 line 6) from a retained partial semantic structure (Col. 23 line 40-46) and semantic entries in a semantic node (Col. 9 lines 32-43 and Fig. 5)

determining that there are no more semantic nodes to process (Col. 18 line 62 – Col. 19 line 8 Fig. 6 item 606)

However, Su fails to teach determining that the full semantic structure is not a command semantic structure (Sumita Col. 3 lines 45-55)

placing the full semantic structure in multiple command semantic structures (Sumita Col. 14 lines 1-17) after determining there are no more semantic nodes to process and after determining that the full semantic structure is not a command semantic structure (Sumita Col. 3 lines 45-55)

scoring each command semantic structure (Sumita Col. 22 lines 1 -14), selecting one of the command semantic structures based on the scores (Sumita Col. 22 lines 1 -14)

Sumita teaches a document detection system, comprising: input analysis means for determining a semantic structure of a detection command containing natural language expressions entered by a user; document storage means for storing a plurality of detection target documents; and detection processing means for detecting those detection target documents stored in the document storage means which contain the semantic structure of the detection command determined by the input analysis means as detected documents.

Sumita teaches the semantic structure of the input character string is taken out from the individual data storage unit 16 at the step 1105, and the detection using the taken out semantic structure is carried out on a semantic structure index memory in the document storage unit 15 which stores all the semantic structures of all the documents in the document database, so as to obtain those documents which have the same semantic structure as that of the input character string.

Further, Sumita teaches detected documents are weighted according to the display priority scores determined in accordance with the document structure analysis result such as the title, table of content, index, and references of each document. For example, the display priority scores can be assigned as indicated in FIG. 39. In this case, the highest score for which each document qualify under the conditions concerning the keyword and the highest score for which each document qualify under the conditions concerning the semantic structure are added together as the score of each document, and the detected documents are displayed in a descending order of the assigned score.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Su to incorporate determining a semantic command structure and placing the semantic structure in a command semantic structure as taught by Sumita to allow for the detection of target documents containing natural language data (Sumita Col. 3 lines 45-55). Further it would have also been obvious to one of ordinary skill in the art at the time of the invention selecting a highest scoring command semantic structure as the semantic structure of the text to allow for weighted priority scores to detect keywords and a summation of conditions relevant to semantic structures to be displayed (Sumita Col. 3 lines 45-55).

Re claim 20, Su teaches a computer-readable medium of claim 19 wherein identifying semantic entities comprises utilizing a schema (Col. 18 line 50-61) in which semantic entities are associated with text (Col. 9 line 66 – Col. 10 line 6)

Re claim 21, Su teaches a computer-readable medium of claim 19 wherein forming a set of partial semantic structures (Col. 23 line 40-46) comprises

accessing a table (Col. 18 line 34-49) to find an entry indexed (Col. 17 line 47-66) by two semantic entities (Col. 2 line 49-66) identified from the text, the entry providing a plurality of semantic structures (Col. 16 line 31-49) that include both of the two semantic entities (Col. 3 line 29-39) forming a partial semantic structure (Col. 23 line 40-46) for each of the semantic structures provided by the entry (Col. 23 line 40-46)

Re claim 22, Su teaches a computer-readable medium of claim 21 further comprising building the table (Col. 18 line 34-49) from a schema (Col. 18 line 50-61) that describes relationships between semantic entities (Col. 21 line 4-10)

Re claim 23, Su teaches a computer-readable medium of claim 2I wherein at least one partial semantic structure (Col. 23 line 40-46) comprises a semantic entity that is not identified from the text (Col. 3 line 63 – Col. 4 line 3, Col. 18 line 50-61)

Re claim 24, Su teaches a computer-readable medium of claim 23 wherein scoring a partial semantic structure (Col. 23 line 40-46) comprises calculating a score (Col. 21 line 40-49) for each entity in the partial semantic structure, wherein the score for an entity is reduced (Col. 16 line 31-49) if the entity was not identified from the text (Col. 3 line 63 - Col. 4 line 3, Col. 18 line 50-61)

Re claim 25, Su teaches a computer-readable medium of claim 19 wherein forming a full semantic structure comprises combining a partial semantic structure (Col. 23 line 40-46) with a semantic entity identified from the text (Col. 9 line 66 – Col 10 line 6).

Re claim 26, Su teaches a computer-readable medium of claim 25 wherein forming a full semantic structure comprises

determining if the semantic entity can be placed beneath (Col. 21 line 11-15) any of the entities in the partial semantic structure (Col. 23 line 40-46)

determining if a head (Col. 21 line 1-10) of the partial semantic (Col. 23 line 40-46) structure can be placed beneath (Col. 21 line 11-15) the semantic entity

determining if a head of the partial semantic structure and the semantic entity can both be placed beneath a common ancestor entity (Col. 21 line 1-10)

Re claim 29, Su teaches a computer-readable medium of claim 19 wherein scoring a partial semantic structure comprises determining a semantic score (Col. 21 line 40-49) based on the semantic entities in the partial semantic structure (Col. 23 line 40-46) and the relationship between the semantic entities in the partial semantic structure (Col. 21 line 4-10).

Re claim 30, Su teaches a computer-readable medium of claim 29 wherein scoring (Col. 21 line 40-49) a partial semantic structure (Col. 23 line 40-46) further comprises determining a syntactic score (Col. 9 line 66 – Col. 10 line 18) based on positions of words in the text associated with the semantic entities (Col. 9 line 66 – Col 10 line 6).

Re claim 31, Su teaches a computer-readable medium of claim 30 wherein scoring a partial semantic structure further comprises determining a transition score (Col. 21 line 40-49) based on the order of semantic entities, wherein the order is set by the alignment of the semantic entities to the text that is associated with the semantic entities (Col. 20 line 20-33).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Colucci whose telephone number is (571)-270-1847. The examiner can normally be reached on 9:30 am - 6:00 pm, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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